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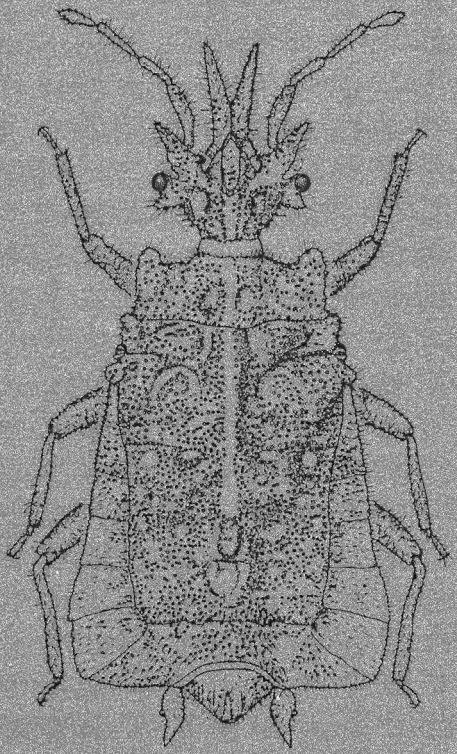

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Cover: *Granulaptera cooki* Monteith (Hemiptera: Aradidae) is one of many wingless species of bark bugs found in the rainforests of the Wet Tropics of northern Queensland. This species is generally restricted to high altitudes in the northern Wet Tropics and is most common on Mt Finnigan. Illustration by Geoff Thompson.

RECORDS OF INSECT PESTS ON CHRISTMAS ISLAND AND THE COCOS (KEELING) ISLANDS, INDIAN OCEAN

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Abstract

A survey for pests of crops on Christmas Island and the Cocos (Keeling) Islands was conducted in May 2000. Fifteen new pest records were obtained from Christmas I., viz: *Aleurocanthus woglumi* Ashby and *Neomaskellia bergii* (Signoret) (Aleyrodidae), *Pentalonia nigronervosa* Coquerel (Aphididae), *Coccus* sp. and *Saissetia* sp. (Coccidae), *Lepidosaphes* sp. and *Lindingaspis* sp. (Diaspididae), *Dysmicoccus* sp. and *Nipaecoccus viridis* (Newstead) (Pseudococcidae), *Amrasca devastans* (Distant) (Cicadellidae), *Ophiomyia phaseoli* (Tryon) (Agromyzidae), *Bactrocera albistrigata* (de Meijere), *B. arecae* (Hardy & Adachi) and *B. umbrosa* (F.) (Tephritidae) and *Cosmopolites sordidus* (Germar) (Curculionidae). Six new records were obtained from the Cocos (Keeling) Is, viz: *Aphis gossypii* Glover, and *Rhopalosiphum maidis* (Fitch) (Aphididae), *Ceroplastes rubens* Maskell (Coccidae), ?*Icerya* sp. (Margarodidae), *Ferrisia virgata* (Cockerell) and *Saccharicoccus sacchari* (Cockerell) (Pseudococcidae) and *Cosmopolites sordidus* (Germar) (Curculionidae). *Aleurocanthus woglumi, Amrasca devastans, Bactrocera albistrigata* and *B. arecae* also represent new records for Australia although these species are known so far only from Christmas I. A list of insect pests so far recorded from these islands is also included.

Introduction

Australia's Indian Ocean Territories comprise Christmas Island and the Cocos (Keeling) Islands. They are remote from mainland Australia, with Christmas I. lying about 1700 km NW of the mainland and 300 km south of Java and the Cocos (Keeling) Is a further 900 km to the west. None were inhabited prior to settlement by the British in 1888. The Cocos (Keeling) Is were once owned by the Clunies Ross family, who attracted labour from Malaya and Singapore to maintain the extensive coconut plantations they established there. Prior to being transferred to Australian sovereignty in 1955, these islands were administered at various times by the governments of Sri Lanka and Singapore and the airstrip was used extensively by the Australian and British military during and after the Second World War. Christmas I. was administered by the British until transferred to Australian sovereignty in 1958. It was briefly occupied by the Japanese during the Second World War. Like the coconut plantations on Cocos (Keeling) Is, the phosphate mine at Christmas I. attracted large numbers of Chinese and Malay labourers.

The insect faunas of Christmas I. and the Cocos (Keeling) Is have been surveyed sporadically over the past 100 years (see Campbell 1966 and CSIRO 1990 for a full historical account). However, the relative lack of an

agricultural service on these islands, due in part to a lack of commercial agriculture, has resulted in an incomplete knowledge of the pest fauna present. In fact, only one survey for such pests has been undertaken on Christmas I. (Campbell 1968) and two on the Cocos (Keeling) Is (Campbell 1966), although the WA Quarantine and Inspection Service has periodically trapped fruit flies on Christmas I. The relative dearth of agriculture on these islands requires that nowadays most food, including fresh fruit and vegetables, must be imported from Perth, Western Australia or, in the case of Christmas I., also from Jakarta, Indonesia.

These surveys identified a number of pests that are not present on mainland Australia. The presence of these pests has resulted in these territories being regarded as having a different quarantine status from that of the mainland. Strict quarantine protocols are in place to prevent the spread of pests from these islands to the rest of Australia. Consequently, all records from these islands of pests that are not present elsewhere in Australia are regarded as technically present in Australian territory but exotic for quarantine purposes.

A survey of the insect pests of Christmas I. and the Cocos (Keeling) Is was conducted in May 2000. For the purposes of this paper, a pest insect is defined as an insect reported to feed on commercial plant species or products thereof or, in the case of ants, reported to cause environmental disruption or are pests of households. Those species collected in large numbers from commercial plant species or believed to be damaging the plant are also listed. Also for the purpose of this paper, mainland Australia includes all islands of the Commonwealth of Australia except those under consideration here.

Methods and materials

All inhabited areas and a representative number of uninhabited sites on the islands were visited. Plants, mostly food plants or their relatives, were inspected for presence of insect pests and these were collected by hand or sweep net. Mini light traps were set at Home and West Islands in the Cocos (Keeling) Is and in a rainforest site, locally known as the 'Pink House' and near the poultry farm on Christmas I. Steiner fruit fly traps baited with cuelure, trimedlure and methyl eugenol were also set on Home and West Islands and at the 'Pink House', Drumsite, Grant's Well, the Dales and at the market garden on Christmas I. Other material from Christmas I., lodged in the Australian National Insect Collection, CSIRO, Canberra (ANIC) and in the Agriculture WA collection in Perth (AgWA), was also examined.

Results

Tables 1 and 2 list all pest insect species thus far recorded from Christmas and Cocos (Keeling) Is. Fifteen species are newly recorded from Christmas I.; four are also new for Australia but so far are not known from the mainland. Six species are newly recorded from the Cocos (Keeling) Is but none are new for Australia.

Table 1. Pest insects recorded from Christmas Island. (N/I = no information).

Species	Family	Common name	Collected from	Source
ORTHOPTERA				
Gryllodes sigillatus (Walker)	Gryllidae	Indian house cricket / tropical house cricket	N/I	CSIRO 1990
Oxya orientalis Kirby	Acrididae	Grasshopper	N/I	Campbell 1968
Locusta migratoria (L.)	Acrididae	Migratory locust	N/I	Campbell 1968; CSIRO 1990
HEMIPTERA				
Aleurocanthus woglumi Ashby*	Aleyrodidae	Citrus blackfly	Lime	This study
Neomaskellia bergii (Signoret)	Aleyrodidae	Sugarcane whitefly	Sugarcane	This study
Aphis craccivora Koch	Aphididae	Cowpea aphid	N/I; Long bean	CSIRO 1990; this study
Aphis gossypii Glover	Aphididae	Cotton aphid / melon aphid	N/I	CSIRO 1990
Hysteroneura setariae (Thomas)	Aphididae	Rusty plum aphid	N/I	CSIRO 1990
Pentalonia nigronervosa Coquerel	Aphididae	Banana aphid	Banana	This study
Toxoptera citricida (Kirkaldy)	Aphididae	Black citrus aphid	N/I	CSIRO 1990
Toxoptera aurantii (Boyer de Fonscolombe)	Aphididae	Black citrus aphid	N/I	CSIRO 1990
Rhopalosiphum maidis (Fitch)	Aphididae	Corn aphid	N/I	CSIRO 1990
Icerya purchasi Maskell	Margarodidae	Cottony cushion scale	N/I	Campbell 1968
Dysmicoccus sp	Pseudococcidae	Mealybug	Guava	This study
Nipaecoccus viridis (Newstead)	Pseudococcidae	Spherical mealybug	Asparagus	This study
Nipaecoccus viridis (Newstead)	Pseudococcidae	Spherical mealybug	Lime	This study
Pseudococcus longispinus (Targioni Tozzetti)	Pseudococcidae	Longtailed mealybug	N/I	CSIRO 1990
Coccus sp.	Coccidae	Soft scale	Lime	This study
Saissetia sp.	Coccidae	Soft scale	Eggplant	This study
Saissetia sp.	Coccidae	Soft scale	Asparagus	This study
Tachardina ?aurantiaca (Cockerell)	Kerriidae	Lac scale	N/I	Campbell 1968

Aspidiotus destructor Signoret	Diaspididae	Transparent scale	N/I; Banana and coconut	Campbell 1968; this study
Lepidosaphes sp.	Diaspididae	Armoured scale	Lime	This study
Lindingaspis sp.	Diaspididae	Armoured scale	Lime	This study
Pseudaulacaspis pentagona (Targioni-Tozzetti)	Diaspididae	Peach white scale	N/I	Campbell 1968; this study
Kallitaxila granulata (Stål)	Tropiduchidae	Planthopper	Citrus, mango	CSIRO 1990; this study
Amrasca devastans (Distant) (?= *A. biguttula* (Ishida))*	Cicadellidae	Indian cotton leafhopper	Eggplant	This study
Cicadulina bipunctella (Matsumara).	Cicadellidae	Leafhopper	N/I	CSIRO1990
Typhlocybinae: Empoascini, ?genus	Cicadellidae	Leafhopper	Long bean	This study
Typhlocybinae: Erythroneurini, ?genus	Cicadellidae	Leafhopper	Winged bean	This study
Engytatus nicotianae (Koningsberger)	Miridae	Tomato mirid	N/I	CSIRO 1990
Hyalopeplus malayensis Carvalho & Gross	Miridae	Mirid	N/I	CSIRO 1990
Elasmolomus sordidus (F.)	Lygaeidae	Peanut trash bug	N/I	CSIRO 1990
Leptocoris subrufescens (Kirby)	Rhopalidae	Rhopalid bug	N/I	CSIRO 1990
Nezara viridula (L.)	Pentatomidae	Green vegetable bug	N/I	Campbell 1968; CSIRO 1990
COLEOPTERA				
Lasioderma serricorne (F.)	Anobiidae	Cigarette beetle / tobacco beetle	N/I	CSIRO 1990
Dinoderus minutus (F.)	Bostrichidae	Bamboo borer	N/I	CSIRO 1990
Heterobostrichus aequalis (Waterhouse)	Bostrichidae	Lesser auger beetle	N/I	Campbell 1968; CSIRO 1990
Minthea rugicollis (Walker)	Bostrichidae	Hairy powderpost beetle	N/I	CSIRO 1990
Rhyzopertha dominica (F.)	Bostrichidae	Lesser grain borer	N/I	CSIRO 1990
Sinoxylon anale (Lesne)	Bostrichidae	Auger beetle	N/I	Campbell 1968; CSIRO 1990

Xylothrips religiosus (Boisduval)	Bostrichidae	Northern auger beetle	N/I	Campbell 1968; CSIRO 1990
Dermestes ater De Geer	Dermestidae	Hide beetle	N/I	CSIRO 1990
Ahasverus advena (Waltl)	Silvanidae	Foreign grain beetle	N/I	CSIRO 1990
Cylas formicarius elegantulus (Summers)	Brentidae	Sweet potato weevil	N/I	Campbell 1968; CSIRO 1990
Cosmopolites sordidus (Germar)	Curculionidae	Banana root weevil / banana weevil borer	Banana	This study
Diocalandra frumenti (F.)	Curculionidae	Palm weevil borer / lesser coconut weevil	N/I	Campbell 1968; CSIRO 1990
Sitophilus oryzae (L.)	Curculionidae	Rice weevil	N/I	Campbell 1968; CSIRO 1990
Xyleborus perforans (Wollaston)	Curculionidae	Island pinhole borer	N/I	CSIRO 1990
DIPTERA				
Ophiomyia phaseoli (Tryon)	Agromyzidae	Bean fly	*Vigna unguiculata*	This study
Bactrocera albistrigata (de Meijere)*	Tephritidae	Fruit fly	CUE trap	This study
Bactrocera arecae (Hardy & Adachi)*	Tephritidae	Betel-nut fly	Sweeping lime tree	This study
Bactrocera cucurbitae (Coquillett)	Tephritidae	Melon fly	CUE trap	Campbell 1968; this study
Bactrocera papayae Drew & Hancock	Tephritidae	Papaya fruit fly / Asian papaya fruit fly	ME trap	Drew and Hancock 1994; this study
Bactrocera umbrosa (F.)	Tephritidae	Breadfruit fly	ME trap	This study
LEPIDOPTERA				
Plutella xylostella (L.)	Plutellidae	Cabbage moth / diamondback moth	N/I	Campbell 1968; CSIRO 1990
Diaphania indica (Saunders)	Pyralidae	Cucumber moth	N/I	Campbell 1968; CSIRO 1990
Hymenia recurvalis (F.)	Pyralidae	Beet webworm	N/I	CSIRO 1990
Nacoleia octasema (Meyrick)	Pyralidae	Banana scab moth	N/I	CSIRO 1990
Achaea janata (L.)	Noctuidae	Castor oil looper	N/I	CSIRO 1990

Chrysodeixis eriosoma (Doubelday)	Noctuidae	Looper	N/I	Campbell 1968; CSIRO 1990
Eudocima (= *Othreis*) *materna* (L.)	Noctuidae	Fruitpiercing moth	N/I	Campbell 1968; CSIRO 1990
Eudocima (= *Othreis*) *fullonia* (Clerck)	Noctuidae	Fruitpiercing moth	N/I	Campbell 1968; CSIRO 1990; this study
Helicoverpa armigera (Hübner)	Noctuidae	Cotton bollworm / corn earworm / tobacco budworm	N/I	CSIRO 1990
Helicoverpa assulta (Guenée)	Noctuidae	Cape gooseberry budworm	N/I	CSIRO 1990
Spodoptera litura (F.)	Noctuidae	Cluster caterpillar	N/I	Campbell 1968; CSIRO 1990
Spodoptera mauritia (Boisduval)	Noctuidae	Lawn armyworm	N/I	Campbell 1968; CSIRO 1990
Hyblaea puera Cramer	Hyblaeidae	Moth	N/I	Campbell 1968; CSIRO 1990
Papilio memnon L.	Papilionidae	Christmas swallowtail	N/I Lime	Braby 2000; Moulds and Humphrey 2000; this study
HYMENOPTERA				
Anoplolepis gracilipes (Fr. Smith)	Formicidae	Crazy ant	N/I	CSIRO 1990; this study
Monomorium floricola (Jerdon)	Formicidae	Ant	N/I	CSIRO 1990
Monomorium latinode Mayr	Formicidae	Ant	N/I	CSIRO 1990
Monomorium pharaonis (L.)	Formicidae	Pharaoh's ant	N/I	Donisthorpe 1935
Ochetellus glaber (Mayr)	Formicidae	Black house ant	N/I	CSIRO 1990
Paratrechina bourbonica (Forel)	Formicidae	Ant	N/I	CSIRO 1990
Paratrechina longicornis (Latreille)	Formicidae	Hairy ant	N/I	CSIRO 1990
Paratrechina minitula (Forel)	Formicidae	Ant	N/I	CSIRO 1990

Pheidole megacephala (F.)	Formicidae	Coastal brown ant / Madeira ant	N/I	CSIRO 1990
Solenopsis geminata (F.)	Formicidae	Ginger ant / tropical fire ant	N/I	CSIRO 1990
Tapinoma melanocephalum (F.)	Formicidae	Ghost ant	N/I	CSIRO 1990
Technomyrmex albipes (Fr. Smith)	Formicidae	Whitefooted house ant / black household ant	N/I	CSIRO 1990
Tetramorium bicarinatum (Nylander)	Formicidae	Ant	N/I	CSIRO 1990
Tetramorium insolens (Fr. Smith)	Formicidae	Ant	N/I	CSIRO 1990
Tetramorium lanuginosum Mayr	Formicidae	Ant	N/I	CSIRO 1990
Tetramorium pacificum Mayr	Formicidae	Ant	N/I	CSIRO 1990
Tetramorium simillimum (Fr. Smith)	Formicidae	Ant	N/I	CSIRO 1990

*New record for Australia but thus far restricted to Christmas Island.

Table 2. Pest insects recorded from the Cocos (Keeling) Is. (N/I = no information).

Species	Family	Common name	Collected from	Source
ORTHOPTERA				
Locusta migratoria (L.)	Acrididae	Migratory locust	N/I	Campbell 1966
Nomadacris guttulosa (Walker)	Acrididae	Spur-throated locust	N/I	Campbell 1966
HEMIPTERA				
Aphis gossypii Glover	Aphididae	Cotton aphid / melon aphid	*Chromolaena odorata*	This study
Pentalonia nigronervosa Coquerel	Aphididae	Banana aphid	N/I	Campbell 1966
Rhopalosiphum maidis (Fitch)	Aphididae	Corn aphid	*Thuarea involuta*	This study
Ceroplastes rubens Maskell	Coccidae	Pink wax scale	*Syzygium aqueum*	This study
?*Icerya* sp.	Margarodidae	Cushion scale	Lime	This study
Ferrisia virgata (Cockerell)	Pseudococcidae	Striped mealybug	Tomato	This study
Saccharicoccus sacchari (Cockerell)	Pseudococcidae	Pink sugarcane mealybug	Sugarcane	This study
Nezara viridula (F.)	Pentatomidae	Green vegetable bug	N/I	Campbell 1966

COLEOPTERA				
Oryctes rhinoceros (L.)	Scarabaeidae	Coconut rhinoceros beetle	Coconut	Campbell 1966; this study
Agrilus marmoreus Deyrolle	Buprestidae	Jewel beetle	Lime	Campbell 1966
Cosmopolites sordidus (Germar)	Curculionidae	Banana root weevil / banana weevil borer	Banana	This study
Diocalandra frumenti (F.)	Curculionidae	Palm weevil borer / lesser coconut weevil	Coconut	Campbell 1966
Dermestes ater De Geer	Dermestidae	Hide beetle	N/I	Campbell 1966
LEPIDOPTERA				
Achaea janata (L.)	Noctuidae	Castor oil looper	N/I	Campbell 1966
Chrysodeixis eriosoma (Doubelday)	Noctuidae	Looper	N/I	Campbell 1966
Helicoverpa armigera (Hübner)	Noctuidae	Cotton bollworm / corn earworm / tobacco budworm	N/I	Campbell 1966
Spodoptera litura (F.)	Noctuidae	Cluster caterpillar	N/I	Campbell 1966
Spodoptera mauritia (Biosduval)	Noctuidae	Lawn armyworm	N/I	Campbell 1966
HYMENOPTERA				
Anoplolepis gracilipes (Fr. Smith)	Formicidae	Crazy ant	N/I	Campbell 1966; this study
Paratrechina longicornis (Latreille)	Formicidae	Hairy ant	N/I	Campbell 1966
Solenopsis geminata (F.)	Formicidae	Ginger ant / tropical fire ant	N/I	Campbell 1966; this study

Discussion

Both Christmas I. and the Cocos (Keeling) Is contain a range of insect pests, many of which are tropicopolitan and are known to be spread by commerce. Some of these, for example crazy ant (O'Dowd *et al.* 1999), are causing considerable damage to the environment. The presence of a number of pest species that are not present on mainland Australia provides support for the current placement of quarantine restrictions between these islands and the mainland.

One can only speculate on how, when, whence and by whom or what the incursions were made. History and geographical location - early British

settlement, Asian labour, Asian and Australian administration and trade, Japanese wartime occupation of Christmas I., British military presence on Cocos (Keeling) Is and proximity to Indonesia, especially of Christmas I. - have undoubtedly been important factors in determining the exotic biotic composition of the islands. Significantly, all the pest species recorded are also known from southeast Asia, which suggests the likelihood that this region is the source of the majority of the pest species now present on Christmas I. at least. Insect adventives can reach an island environment by direct flight, aerial dispersal by wind, parasitism or phoresy and by drift, boat or airplane, with or without carriage on/in plant material or by human or animal agency.

Many of the adults of pest species listed are known to have excellent powers of flight. Small, lightweight insects, both apterous and alate, such as aphids and first instar crawlers of Coccoidea are commonly dispersed by wind (e.g. Loxdale *et al.* 1993, Willard 1974). The carriage over long distances as aerial plankton of leafhoppers (Cicadellidae) has been recorded (Ghauri 1983) and transport of Coccoidea by birds and bats (Lever 1969) is also possible.

However, arrival on or in plant material is likely to have been the most common method of entry of many of the species listed. Relatively immobile or apterous species, immatures and those species obligately or closely associated with their host plants, e.g. Coccoidea, are more likely to have arrived as contaminants of imported food or plant material. Fruit-infesting species such as tephritid fruit flies are commonly transported as larvae in fruit. All of the fruit fly species found on Christmas I. are known to breed in fruit likely to have been imported from southeast Asia (Allwood *et al.* 1999), although it is surprising that another major pest species of fruit fly present in southeast Asia, *B. carambolae* Drew & Hancock, was not also detected. Successful establishment of the adventives would be largely determined by environmental factors and host availability.

The Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann), has not been detected on these islands despite intensive bait trapping. This fly is common in Perth from where host fruit is imported to both Christmas and the Cocos (Keeling) Is. Its absence on these islands suggests that fruit inspection protocols prior to or after importation are effective and/or these islands do not offer suitable habitat for this fly. The absence of fruit flies from the Cocos (Keeling) Is may be due to environmental or host availability factors but is more likely because these islands do not import host fruit material from southeast Asia.

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NOTES ON THE LIFE HISTORY OF *PAPILIO AMYNTHOR AMPHIARAUS* C. & R. FELDER (LEPIDOPTERA: PAPILIONIDAE) FROM NORFOLK ISLAND

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Abstract

Additional life history notes on *Papilio amynthor amphiaraus* C. & R. Felder from Norfolk Island are presented and the immature stages illustrated for the first time.

Introduction

Two subspecies of *Papilio amynthor* Boisduval have been recognised (Hancock 1983). *P. a. amynthor* Boisduval is known from New Caledonia and the nearby Loyalty Islands (Holloway and Peters 1976), while *P. a. amphiaraus* C. & R. Felder [= *P. ilioneus* Donovan] occurs on Norfolk Island (Smithers 1970).

The life history of *P. a. amynthor* is unrecorded. Holloway and Peters (1976) made no mention of the early stages, although they stated that 'it frequents citrus in cultivated areas and forest margins.'

The life history of *P. a. amphiaraus* was discussed briefly by Smithers (1970, as *P. ilioneus*), who noted the variation in colour of the final instar larva and recorded *Citrus limon* (lemon: Rutaceae) and *Zanthoxylum pinnatum* (Little yellow-wood: Rutaceae) as larval host plants.

In January 2003, all immature stages of *P. a. amphiaraus* were found on cultivated citrus growing in gardens on Norfolk Island. Further details of the life history were observed and are presented below.

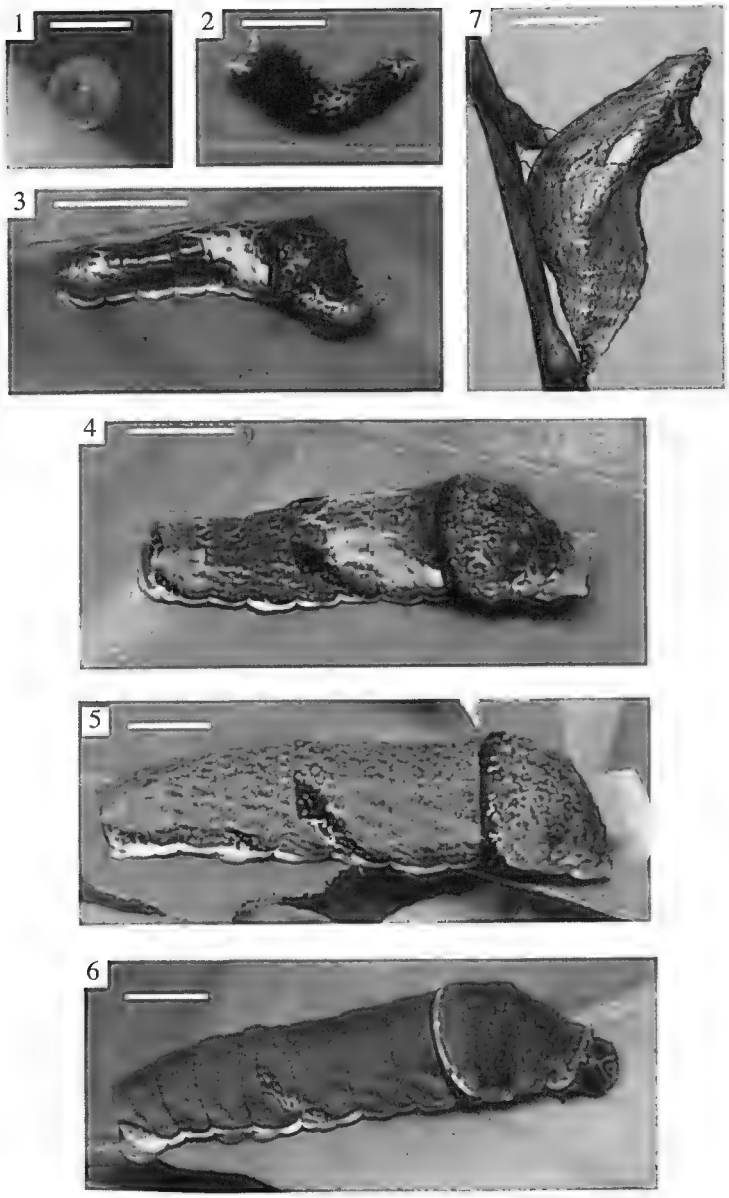
Life history

Foodplant. Citrus limon (Rutaceae).

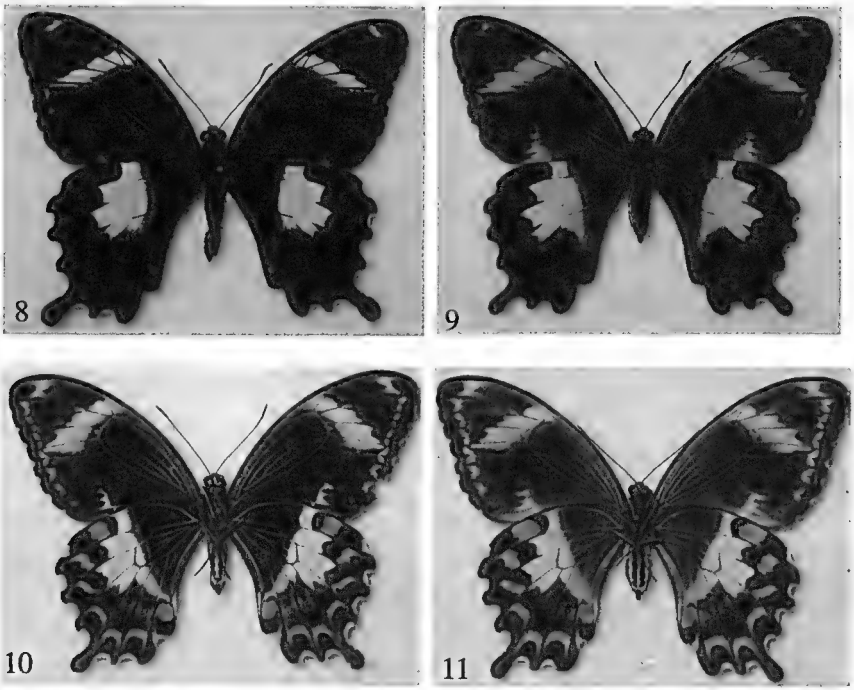
Egg (Fig. 1). Spherical, cream-yellow and smooth; 1.8 mm in diameter.

First instar larva (Fig. 2). Length 4 mm. Head dark brown to black; prothoracic spines dark brown and dark cream posteriorly; body dark brown with black dorsal spines on abdominal segments; pale white dorsal saddle on abdominal segments 1-4; whitish dorsal stripe on abdominal segment 8; anal segment with spines white above a yellowish orange dorsal stripe.

Second and third instar larvae (Fig. 3). Length 6-15 mm. Head mid brown to beige; prothoracic horns well developed and pale orange; thoracic segment humped and dark brown; abdominal segments 1-3 with white saddle; anal segment with small orange horns; greenish spiracular stripe edged below with a white stripe; spiracles black.



Figs 1-7. *Papilio amynthor amphiaraus,* immature stages. (1) egg; (2) first instar larva; (3) late third instar larva; (4) fourth instar larva; (5-6) final instar larval colour forms; (7) pupa. Scale bars: Figs 1-2 = 2 mm; Figs 3-7 = 1 cm.



Figs 8–11. *Papilio amynthor amphiaraus*, upper and undersides of adults. (8, 10) male; (9, 11) female.

Fourth instar larva (Fig. 4). Length 32-40 mm. Head pale brown; body variable mottled green, brown and cream with prothoracic and anal horns yellow; distinctive black collar around abdominal segment 1; a distinctive pair of black stripes starting ventrally on abdominal segment 4 and broadening dorsolaterally on abdominal segment 5; white subspiracular stripe with distinctive black stripes above on abdominal segments 6 and 9; anal plate translucent green.

Final instar larva (Figs 5-6). Length 58-61 mm. Head pale brown with whitish-grey inverted Y edged with thin black lines; body variable but generally occurring in two colour forms. Form 1 (Fig. 5) has the body mottled green and yellowish cream, with distinctive brown and black collar on abdominal segment 1; body smooth with small horns on the anal segment and prothoracic plate varying in colour from green to pale orange; a distinctive pair of mottled black and white stripes starting ventrally on abdominal segment 4 and broadening dorsolaterally to abdominal segment 5; abdominal segments sometimes marked ventrally with brown; white subspiracular stripe

with distinctive black stripes above on abdominal segments 6 and 9; anal plate black. Form 2 (Fig. 6) has the body mottled dark green to pale green; distinctive white collar edged with thin black lines on abdominal segment 1; body smooth with small green horns on the anal segment and prothoracic plate; a distinctive pair of mottled brown and white stripes starting ventrally on abdominal segment 4 and broadening dorsolaterally to abdominal segment 5; white subspiracular stripe lined above with a thin black line thickening towards anal segments; anal plate dark brown to black.

Pupa (Fig. 7). Length 38-41 mm. Slight variation in colouring (n = 4) but generally brown with white to green chevron bilaterally on the thoracic lateral projections and extending to the wing cases; head with two anterior projections; thorax with dorsal projection; dorsal abdominal segments brown and ventral abdominal segments green; attached by the cremaster and supported by a silken girdle.

Discussion

As is typical of the genus, eggs were found on young foliage and older larvae occurred on all leaf stages of the food plant. Adults (Figs 8-11) were present but uncommon, with most found flying in areas of dense forest adjacent to creeks or, occasionally, in suburban gardens. Adult females were a deeper brown with the yellow areas much more orange than those illustrated previously (Braby 2000, D'Abrera 1990), although this may merely represent seasonal colour variation.

Acknowledgements

The authors would like to thank Mr Nicholas Brown for preparing the colour plates and Dr Michael Braby for his advice on relevant references.

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THE FIRST AUSTRALIAN RECORD OF *CEPHRENES MOSELEYI* (BUTLER) (LEPIDOPTERA: HESPERIIDAE) FROM TORRES STRAIT, QUEENSLAND

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Abstract

Cephrenes moseleyi (Butler) is newly recorded from Saibai and Dauan Islands, Torres Strait, Queensland. Male and female specimens are illustrated, the species' identification discussed and field observations provided.

Introduction

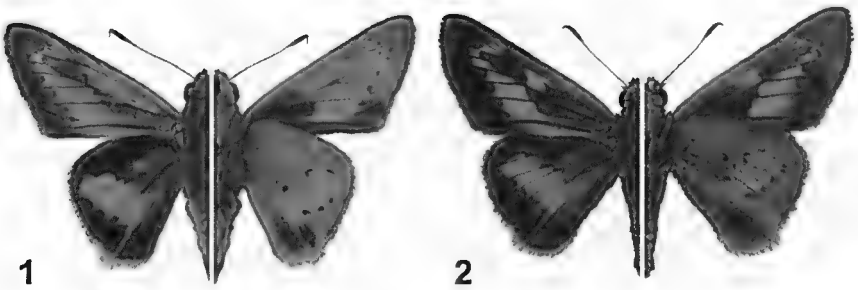
The genus *Cephrenes* Waterhouse & Lyell is a predominately tropical group of skipper butterflies that occurs throughout the Indo-Australian Region, from India to the Philippines, the Moluccas, New Guinea, Australia and the Solomon Islands (Parsons 1998). Parsons (1998) showed that *Cephrenes* contains eight species, of which two are presently known to occur in Australia (Lyons 1999, Braby 2000) and five are recorded from Papua New Guinea (Parsons 1998).

Most *Cephrenes* are robust insects with orange and black markings and are fast flyers (Parsons 1998). The adults can be confused with those of other closely related genera, in particular *Telicota* Moore and *Sabera* Swinhoe, but can be distinguished from these by the absence of a sex brand in the male, the antennae being about half the length of the forewing costa, the apical segment of the labial palpus being very short and stout and the forewing vein CuA_2 arising nearer to the cell base than to its apex (Parsons 1998). Male genitalia structures of *Cephrenes* are also distinctive (Parsons 1998).

The life histories of the two species that occur in Australia are well known (Lyons 1999, Braby 2000), the other six species much less so (Parsons 1998). All *Cephrenes* are known or suspected to feed on palms (Arecaceae).

In 2001, a series of skippers was collected on Saibai and Dauan Islands in the northern sector of Torres Strait, Queensland and these resembled a *Cephrenes* species previously unrecorded from Australia (Braby 2000). Using the taxonomic key and genitalia illustration in Evans (1949) and illustrations in Parsons (1998), these specimens have now been identified as *C. moseleyi* (Butler). In this paper, the identification of this species is discussed, both sexes are illustrated and field observations are provided.

Depository abbreviations are: CEMC - collection of C.E. Meyer, Canberra; TLIKC - joint collections of T.A. Lambkin and A.I. Knight, Brisbane; SSBC - collection of S.S. Brown, Bowral.



Figs 1-2. *Cephrenes moseleyi* (Butler). (1) male: upperside [left], underside [right], forewing length 19 mm, Saibai Island, 19.iv.2001, A.I. Knight (TLIKC); (2) female: upperside [left], underside [right], forewing length 21 mm, Dauan Island, 13.iv.2001, A.I. Knight (TLIKC).

Cephrenes moseleyi (Butler)

(Figs 1-2)

Material examined. QUEENSLAND: 1 ♂, Saibai Island, Torres Strait, 19.iv.2001, A.I. Knight (in TLIKC); 1 ♂, Saibai Island, Torres Strait, ex larva, emerged 28.iv.2001, C.E. Meyer (in CEMC); 2 ♀♀, Saibai Island, Torres Strait, 6.v.2001, A.I. Knight (in TLIKC); 1 ♂, Dauan Island, Torres Strait, 13-16.iv.2001, S.S. Brown (in SSBC); 2 ♀♀, Dauan Island, Torres Strait, 13.iv.2001, 14.v.2001, A.I. Knight (in TLIKC).

Comments. *Cephrenes moseleyi* resembles *C. trichopepla* (Lower) in colouring but has a general shape closer to *C. augiades* (C. Felder). Evans (1949) discerned two groups within the genus, based on the apical shape of the uncus. The group containing *C. trichopepla* has the uncus tridentate while the uncus from the group containing *C. augiades* and *C. moseleyi* is bidentate. Furthermore, *C. moseleyi* is larger than the other two Australian species, the upperside forewing dark border of both sexes is solid and the valvae are symmetrical and deeply excavate at the ends (Evans 1949). All specimens examined showed little variation and were as in Figures 1-2. Parsons (1998) reported that *C. moseleyi* occurs widely across the Papua New Guinea mainland and on many of the PNG island groups, including Bougainville. He described it as being generally rare but occasionally common frequenting areas where its primary host, *Cocos nucifera* (coconut palm), grows. Its appearance on Saibai and Dauan Islands is not surprising considering the islands' proximity to the southern Papuan coastline (five and ten kilometres respectively) and the widespread occurrence of *Cocos nucifera* throughout the region.

Field observations

All specimens of *C. moseleyi* from Saibai and Dauan were collected in the vine scrub / mangrove transitional zones that occur widely on both islands. Within this particular vegetation zone *Cocos nucifera* grows commonly. Both sexes of *C. moseleyi* were observed throughout the day, most often flying low to the ground with a typical rapid and jerky flight in sunlit glades, where they frequently settled on mangrove foliage or branches. They were also collected flying around blossom (S.S. Brown, personal communication). C.E. Meyer (personal communication) found a mature larva of *C. moseleyi* on Saibai feeding on the foliage of a juvenile *Cocos nucifera* close to the water's edge. His description of the larva matched the illustration of the larva of *C. moseleyi* in Parsons (1998).

Acknowledgements

We thank the local community councils of Saibai and Dauan Islands for their cooperation during the time spent on their islands. S.S. Brown and C.E. Meyer provided their material for examination and their notes on field observations. J.S. Bartlett gave valuable assistance with preparation of the colour plate.

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A RANGE EXTENSION FOR *PROTOGRAPHIUM LEOSTHENES LEOSTHENES* (DOUBLEDAY) (LEPIDOPTERA: PAPILIONIDAE) IN SOUTHERN AUSTRALIA

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Abstract

Protographium leosthenes leosthenes (Doubleday) is recorded from Bowral in the Southern Highlands of New South Wales.

Introduction

In Australia, *Protographium leosthenes leosthenes* (Doubleday) is known from Moa Island in Torres Strait (Common and Waterhouse 1981) and from Cape York in Queensland to the Manning River in New South Wales (Braby 2000). Isolated vagrant specimens have been collected or sighted outside this range over the past 100 years at Sandy Hollow near Muswellbrook (R.P. Mayo, in Braby 2000), Sydney (Rainbow 1907, Waterhouse and Lyell 1914, Waterhouse 1932) and Bulli in 1963 (E.D. Edwards, in Braby 2000).

Discussion

A worn female of *P. l. leosthenes* was collected on 1 February 2004 at Bowral, in the Southern Highlands of New South Wales, as it fed on blossom of *Buddleia* sp. in my garden. Specimens of *Graphium eurypylus* (Linnaeus), *Appias paulina* (Cramer) and *Catopsilia pomona* (Fabricius) were flying and feeding on the same bush. The latter three species are regular migrant visitors to this area, usually in January and February. This record extends the distribution of *P. l. leosthenes* to the south-west by some 40 kilometres. It is an interesting record given the altitude of 640 metres at the capture site.

Acknowledgement

The author would like to thank his long-suffering wife Tristy, who kindly witnessed this event.

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DESCRIPTION OF A SECOND SPECIES OF *GNATHOTHLIBUS* WALLENGREN (LEPIDOPTERA: SPHINGIDAE) FROM AUSTRALIA

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Abstract

Gnathothlibus australiensis sp. n. is described and figured from Torres Strait, eastern Queensland and the Northern Territory, Australia. Characters are provided to distinguish it from the sympatric *G. erotus* (Cramer) and the allied *G. vanuatuensis* Lachlan & Moulds.

Introduction

Only one species of *Gnathothlibus* Wallengren, *G. erotus eras* (Boisduval), has been recorded previously from the Australian mainland. D'Abrera (1987) recorded it from Australia eastwards to Tahiti. An undescribed species, similar to but clearly different in the males from *G. erotus* (Cramer), has been collected on Dauan Island in northern Torres Strait and in small numbers along the Queensland coast from Cape York south to Julatten, 60 km NW of Cairns. A single male is known also from Cooloola, near Gympie in SE Qld. Two males have been collected in the Northern Territory, one from Darwin and one from Oenpelli, 240 km to the east. The only specimen thought to be the possible female of this new species is from Brisbane. Placement of this new species in *Gnathothlibus* complies with the wing colouration and the generic diagnosis given by D'Abrera (1987).

Gnathothlibus australiensis sp. n.

(Figs 1-3, 8)

Types. Holotype ♂, QUEENSLAND: Lizard Island, 93 km NNE of Cooktown, Nth Qld, 6.xii.2002, R.B. Lachlan (in Australian National Insect Collection, CSIRO, Canberra [ANIC]). *Paratypes*: 1 ♂, Dauan Is, 9 km S of PNG, 9°25'S, 142°32'E, Torres Strait, 19.i.2004, A.I. Knight; 1 ♂, upper Jardine River, Cape York Pen., N. Qld, 11°19'S, 142°37'E, 22.x.1979, M.S. & B.J. Moulds; 1 ♂, upper Jardine River, Cape York Pen., N. Qld, 11°17'S, 142°35'E, 23.x.1979, M.S. & B.J. Moulds; 1 ♂, Jardine River, Cape York Pen., N. Qld, 11°08'S, 142°29'E, M.S. & B.J. Moulds; 3 ♂♂, 11°13'S, 142°23'E, Bridge Creek (Cape York), 19.xi.1992, at light, A. Calder, P. Zborowski; 1 ♂, 11°41'S, 142°42'E, 14 km ENE Heathlands, Qld, 21.xi.1992, at light, rainforest, P. Zborowski & A. Calder, ANIC genitalia slide 18520; 1 ♂, 11°58'S, 142°55'E, Harmer Creek, Qld, 22.v.1993, at light, riverine forest, P. Zborowski; 1 ♂, Cape York Pen., N.Q., Iron Range, 15.ix.1974, A. & M. Walford-Huggins; 4 ♂♂, Iron Range, N. Qld, 2, 12.v.1975 & 2, 3.vi.1975, M.S. Moulds; 1 ♂, old Lockhart River Mission, Cape York Pen., N. Qld, 24x.1974, M.S. Moulds; 1 ♂, Lizard Island, 93 km NNE of Cooktown, Nth Qld, 13.xii.2002, R.B. Lachlan; 1 ♂, Cooktown, 25.iv.1922 (Qld Museum, Reg. No. T 99173); 1 ♂, Julatten, near foothills of Mt Lewis, N. Qld, .iii.1986, Hans Beste; 2 ♂♂, Julatten, N. Qld, 14.xi.1979, M.S. & B.J. Moulds; 1 ♂, 'Camp Milo', Cooloola, S.E.Q., E. Dahms, 3-13.iii.1970 (Qld Museum, Reg. No. T 99174). NORTHERN TERRITORY: *Paratypes*: 1 ♂, Darwin, N.T., 14.vi.1969, J.C. Le Souef; 1 ♂, 12°17'S, 133°13'E, Birraduk Creek, 18 km NE

Oenpelli, N.T., 1.vi.1973, E.D. Edwards & M.S. Upton. (In ANIC, Queensland Museum, Australian Museum, M. Moulds and RBL collections).

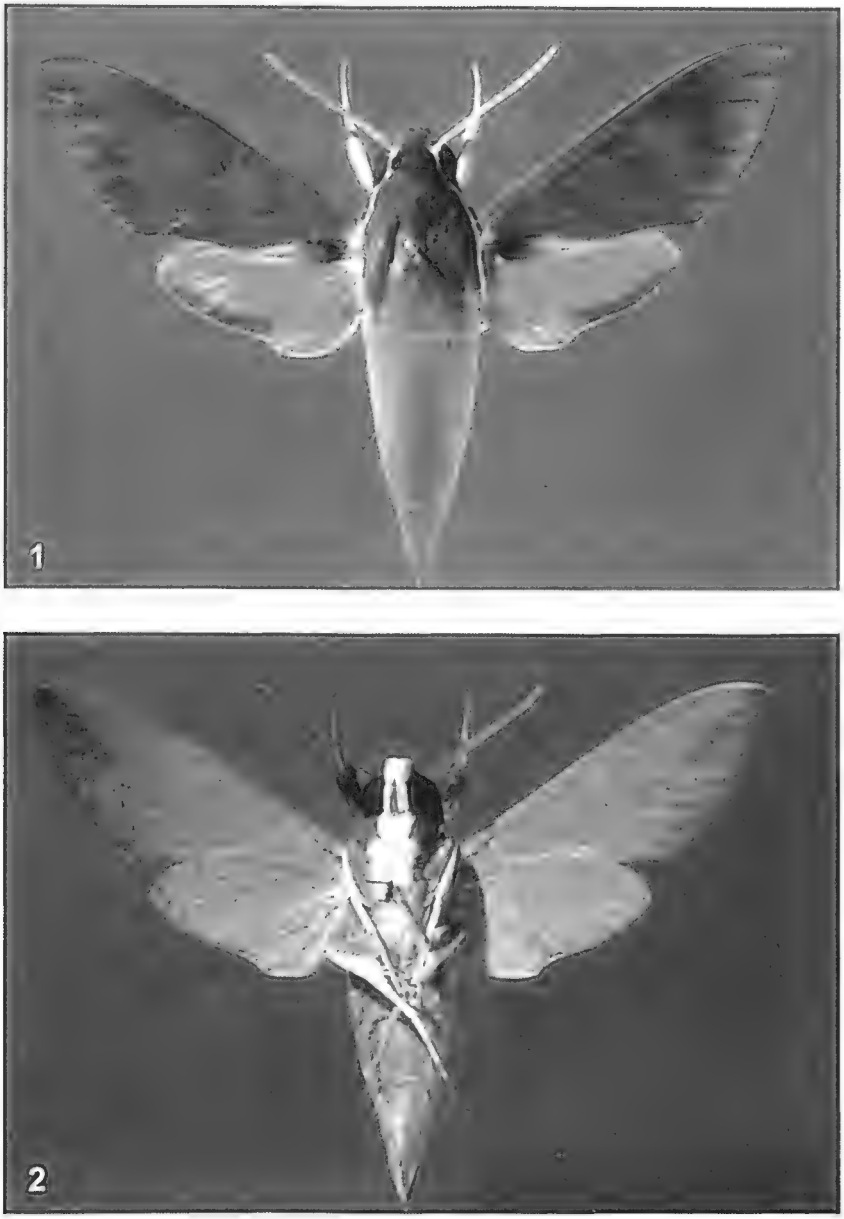
Other material examined. QUEENSLAND: 1 ♀, St. John's Wood, Brisbane, S.E.Q., x.1958, S. Deller (in Queensland Museum).

Description. Male (Figs 1-3). Antennae creamy-brown above, brown below; palpi pinkish-brown above, contrasting white below; dorsal surface of head and thorax uniform medium brown, abdomen slightly lighter brown; small dark median spot on prothorax; thin lateral creamy-white stripe from base of antenna to posterior of tegula. Thorax ventrally with whitish patch immediately posterior to palpi, remainder light creamy-brown. Ventral area of abdomen light pinkish-brown, with three or four lateral tiny black spots surrounded by white. Fore tibiae covered in cream hair scales tinged with pink distally; fore tarsi cream without long hair scales. Mid and hind tibiae with cream hair scales, mid and hind tarsi cream with pinkish-brown distally.

Forewing upperside as in Fig. 1. Forewing length 33-38 mm, mean 35.7 mm (n = 18). Ground colour brown (darker in fresh specimens) with faint, darker markings; unicolorous in overall appearance in most specimens examined; small black stigma with lighter centre barely visible at end of discal cell; a narrow, inwardly oblique post median band runs from costa, where it is curved distally, to inner margin; all other markings barely visible. Forewing underside as in Fig. 2; basal half yellow-brown without markings; distal half with brown ground colour lightly speckled with dark brown. Hindwing upperside as in Fig. 1; ground colour orange; a slightly variable thin dark brown terminal band from apex to tornus, thinnest at apex; little or no brown scaling from inner margin of dark brown band basally along veins R_s to CuA_2. Hindwing underside as in Fig. 2; ground colour light orange-brown; heavily speckled with dark brown; orange-brown tornal patch between veins 1A+2A and 3A.

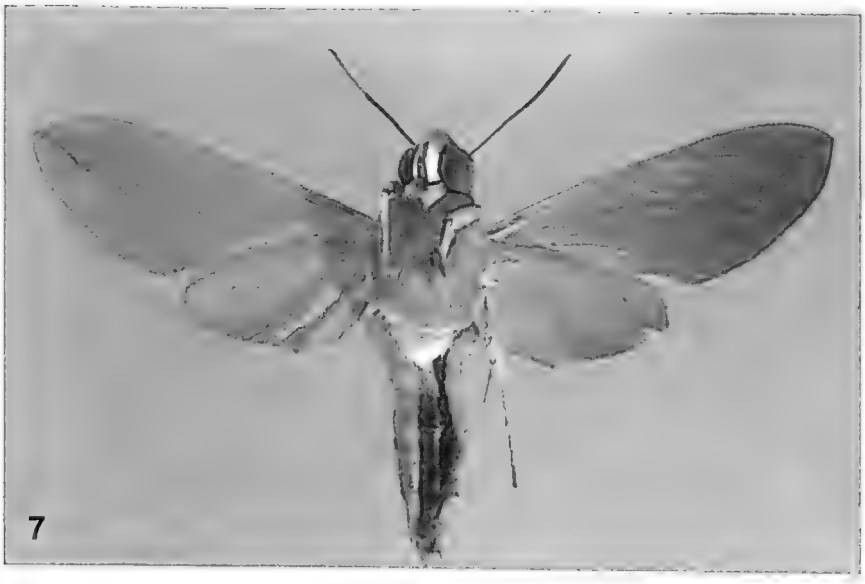
Male genitalia (Fig. 8). Uncus in lateral view longish, slender, parallel sided, clearly arched, distally enlarged with small dark pointed ventral tooth and small pointed dorsal crest, distal vertical margin generally straightish; gnathos in lateral view thin, straight, gradually tapering to a small, slightly upturned point, in dorsal view gnathos is wide basally with a very slight incurve at attachment point to tegumen, distally tapering to a rounded point with straightish sides; valva slightly convex at ventral margin, dorsal margin tending straight then slightly convex, distally rounded; sacculus process robust, distal end dark, tapering to a thin, upturned sharp point, ventral margin straightish basally; aedeagus in lateral view with distal end dark, tapered to a short, small rounded apex with dorsal backward directed barb, with a smaller ventral barb a little proximad of dorsal barb.

Female. Not known with certainty. A specimen which may belong here is illustrated in Figs 6-7.

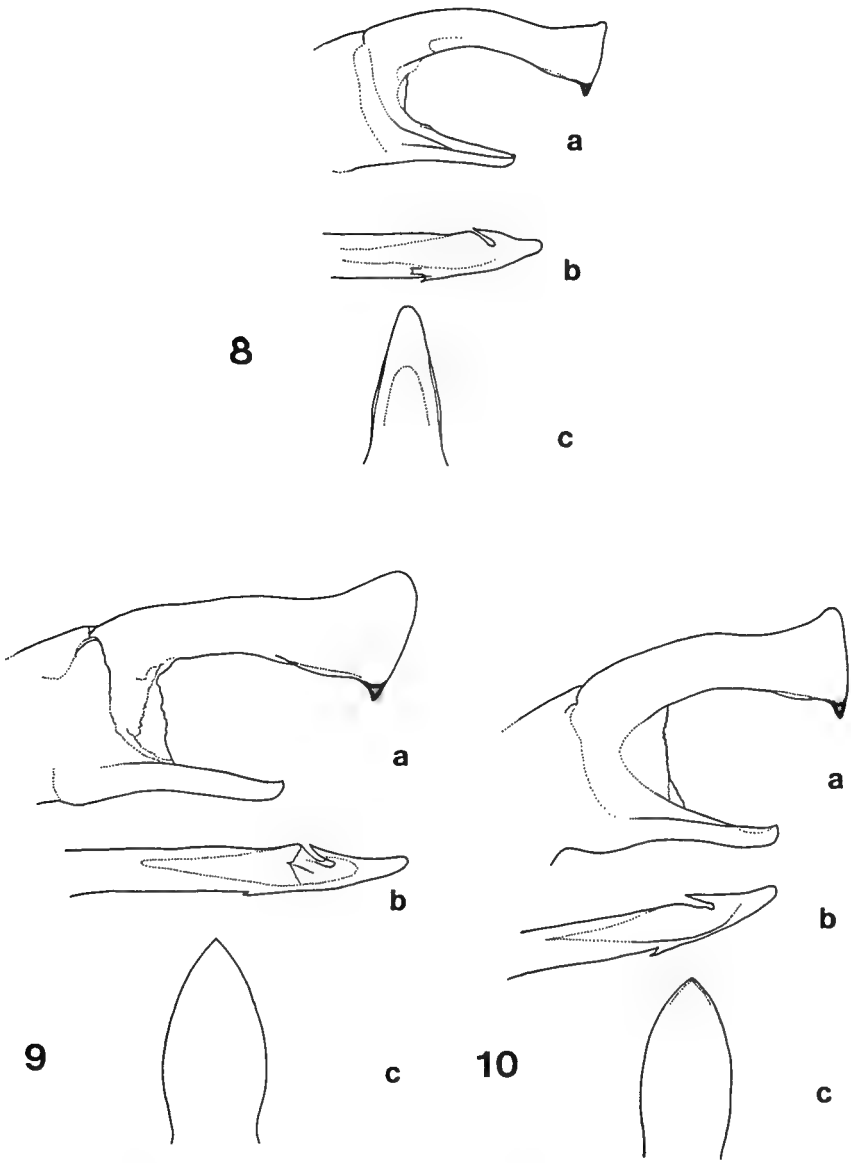


Figs 1-2. *Gnathothlibus australiensis*, holotype male. (1) upperside; (2) underside.

Figs 3-5. *Gnathothlibus* spp., males. (3) *G. australiensis* holotype, fore tarsi and tibia. (4-5) *G. vanuatuensis* holotype: (4) upperside; (5) underside.



Figs 6-7. *Gnathothlibus* sp., possible *G. australiensis* female. (6) upperside; (7) underside.



Figs 8-10. *Gnathothlibus* spp., male genitalia: a, uncus and gnathos (lateral view); b, aedeagus (lateral view); c, gnathos (dorsal view). (8) *G. australiensis*; (9) *G. erotus eras*; (10) *G. vanuatuensis*.

Etymology. The specific name *australiensis* has been chosen to indicate the provenance (Australia) of all known specimens.

Discussion

Gnathothlibus australiensis most closely resembles the common and sympatric *G. erotus eras*, which occurs in Australia, Papua New Guinea, Solomon Islands, New Caledonia and parts of the Pacific, and the allopatric *G. vanuatuensis* Lachlan & Moulds (Figs 4-5), known only from Vanuatu (Lachlan and Moulds 2003). *G. australiensis* is readily distinguished from *G. erotus eras* by the complete absence of any long hair scales on the fore tarsi and a clear reduction in length and thickness of the long hair scales covering the fore tibiae in males. These foreleg characters are shared with *G. vanuatuensis*. However, *G. australiensis* is noticeably smaller than both *G. erotus eras* and *G. vanuatuensis*, particularly when compared in series. The mean forewing length of *G. australiensis* is 35.7 mm (n = 18) and ranged from 33-38 mm. In *G. erotus eras* the mean forewing length is 42 mm (n = 50) and ranged from 37-46 mm. In *G. vanuatuensis* the mean forewing length is 40.7 mm (n = 58) and ranged from 37.5-44.3 mm. (Three abnormally small *G. vanuatuensis* specimens, of 32.7, 33.8 and 35.3 mm, were taken at the end of a long dry season in Vanuatu and were not included in the measurements).

The darker forewing markings tend to be less evident in *G. australiensis*, giving a more unicolorous appearance than generally seen in *G. erotus eras*. By contrast, *G. vanuatuensis* is usually strongly marked. The forewing termen tends to be straighter in *G. vanuatuensis* than in both *G. australiensis* and *G. erotus eras*, where it is almost always clearly more convex. On the hindwing upperside of *G. australiensis*, there is very little or no brown scaling from the inner margin of the thin, dark brown terminal band basally along veins R_s to CuA_2; brown scaling along these veins is common and extensive in many specimens in *G. erotus eras*. In *G. vanuatuensis* the degree of brown scaling along these veins is variable. The thorax of *G. australiensis* has, ventrally, light creamy-brown pilosity; this is clearly browner in *G. erotus eras* and *G. vanuatuensis*.

The male genitalia of *G. australiensis* (Fig. 8) differ from those of *G. erotus eras* (Fig. 9) in lateral view in having a more arched uncus, distally less enlarged with a more pointed dorsal crest and a slightly smaller, ventral tooth. *G. vanuatuensis* (Fig. 10) differs from *G. australiensis* (Fig. 8) in lateral view in having a slightly shorter, more robust uncus with a more prominent black ventral tooth and less curved posterior dorsal margin on the uncus; this posterior dorsal margin is evenly curved in *G. australiensis*. In lateral view the gnathos distal point is less upturned than in *G. erotus eras* and *G. vanuatuensis*. In dorsal view there is only a small incurve on each side at attachment point to tegumen, the incurve being more distinct in *G. erotus eras*. The gnathos is narrower and tapers distally to a clearly more rounded point in *G. australiensis* than in *G. erotus eras* or *G. vanuatuensis*. The

sacculus process in *G. australiensis* tends to be slightly more needle-like distally and not so upturned as seen in *G. erotus eras*; its ventral margin is straightish basally, the margin being slightly, but clearly, convex in *G. erotus eras* and *G. vanuatuensis*. In *G. australiensis* the aedeagus, in lateral view, tapers to a clearly shorter apex than seen in either *G. erotus eras* or *G. vanuatuensis*.

It is surprising, given the morphological differences seen in males of *G. australiensis*, that it has not been possible to find with certainty females which are in any way consistently distinct from those of *G. erotus eras*, despite examining large numbers of females from Australia and Papua New Guinea. In Australia, females of *G. erotus eras* tend to be about 1.4 times larger than males. Applying this formula to the known males of *G. australiensis*, it is expected that the mean forewing length of females would be about 41 mm, with a range of 35-46 mm. Only nine small *G. erotus eras* females have been found to fit inside this range, the two smallest having forewing lengths of 36.5 mm (Figs 6-7) and 39.5 mm.

The genitalia were not examined from the specimen illustrated in Figs 6-7 as the abdomen had collapsed inwards. It is, however, the smallest female known to the author and does display the unicolorous, poorly marked forewings normally seen in the males. The genitalia of numerous females of all sizes were examined but, given the closeness of the two species and the individual variation encountered, the only constant difference seen in two of the small specimens was a longer and narrower lamella postvaginalis (Ted Edwards, pers. comm.). More small females will need to be found and dissected, particularly from Cape York Peninsula where all but four of the known males were collected, to see if this character is constant or is only an extreme variation. The biology of *G. australiensis* is unknown.

Acknowledgements

I sincerely thank Dr Chris Burwell (Queensland Museum, Brisbane), Dr Max Moulds (Australian Museum, Sydney) and Ted Edwards (ANIC, Canberra) for the loan of specimens. Ted Edwards also dissected specimens and provided advice plus valuable notes and drawings on the genitalia. I also thank Dr Ian Kitching (The Natural History Museum, London) for his advice and comments on various species of *Gnathothlibus* in the NHM collection. I am also grateful to Jeff Wright and Geoff Thompson (Queensland Museum) for preparing the photographs and genitalia illustrations respectively. My wife, Deborah Lachlan, typed the manuscript.

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A NEW SPECIES OF *ACUPICTA* ELIOT (LEPIDOPTERA: LYCAENIDAE) FROM SULAWESI, INDONESIA

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Abstract

Acupicta jeffreyi sp. n. is described and figured from Sulawesi and genus *Acupicta* Eliot is recorded from Indonesia for the first time.

Introduction

The genus *Acupicta* Eliot has a curious, very intermittent known distribution, from northern India to the Bismarck Archipelago, Papua New Guinea.

Eliot (1973) erected *Acupicta* for the type species, *A. delicatum* (de Nicéville) from India, and *A. bubases* Hewitson from Malaysia, placing this and the genus *Catapaecilma* Butler into his tribe Catapaecilmatini. Eliot (1974) later described *A. flemingi* Eliot from a single male taken in the Genting Highlands, Malay Peninsula, as well as a similar species, *A. meeki* Eliot from New Hanover and mainland Papua New Guinea (Parsons 1998). More recently, *A. hainanicum* Sugiyama and *A. inopinatum* Schroeder & Treadaway have been described from Hainan, China (Sugiyama 1992) and Mindanao, Philippines (Schroeder and Treadaway 1998), respectively.

The new species described here is highly distinctive and represents the first record of the genus from Indonesia, although both *A. bubases* and *A. flemingi* have been taken in Malaysian Borneo, at 'Quop', Sarawak and in Sabah, respectively (Seki *et al.* 1991, Y. Seki pers. comm. 2003), suggesting that these species might also occur in Kalimantan. No members of the tribe Catapaecilmatini were recorded by Vane-Wright and de Jong (2003) in their checklist of Sulawesi butterflies.

All known *Acupicta* species are exceedingly rare in collections, most being represented by only one or two specimens taken at widely disjunct localities.

Acupicta jeffreyi sp. n.

(Figs 1-2)

Type. Holotype ♀, INDONESIA: ~24 km south-west of Palopo, 900 m, central Sulawesi, 8.ix.2003, C. J. Müller (in Australian Museum Collection, Sydney).

Description. Female (Figs 1-2). Forewing length 19 mm, antenna (length undetermined as both clubs missing). Head grey with dense, light grey-brown hair tufts; antenna (shaft and nudum only) finely ringed brown and cream; labial palpus grey-brown, eyes smooth, narrowly ringed white. Thorax deep grey-brown above with fine grey hairs, brown beneath; legs red-brown, broadly ringed with cream. Abdomen grey-brown above, light brown beneath. Forewing termen strongly convex, inner margin straight; above deep brown, a

large bluish white median area extending from near inner margin to vein M3 and narrowly into cell, termen and apex narrowly striated ochreous brown, cilia dark brown at cell ends, cream between; beneath ochreous brown, intensely striated with dark brown, two rows of subterminal metallic silver-blue striae, parallel to termen, an indistinct subapical dark brown band, more defined towards termen and bound by metallic silver-blue spots, a similar band in median area, offset towards termen below vein CuA_1, subcostal area with abundant metallic silver-blue spots. Hindwing distinctly toothed at vein M_3 and with a 'false' tornus at vein 3A, with white-tipped tails at vein CuA_1 (5 mm), CuA_2 (4 mm) and vein 1A + 2A (1.5 mm); above medium uniform brown, termen with ochreous striations, tornus with margin metallic silver-blue and with subterminal spots of similar colouring below vein CuA_2, cilia dark brown at vein ends, cream between; beneath ochreous brown with dense fine dark brown striae, termen silver-blue at tornus with large black subtornal spot between veins CuA_1 and CuA_2, edged with silver-blue, row of silver blue subterminal spots parallel to termen, postmedian row of silver-blue spots swinging towards base near to costa, series of very irregular black and metallic silver-blue spots in median and basal areas including arcuate pair largely filled with black.

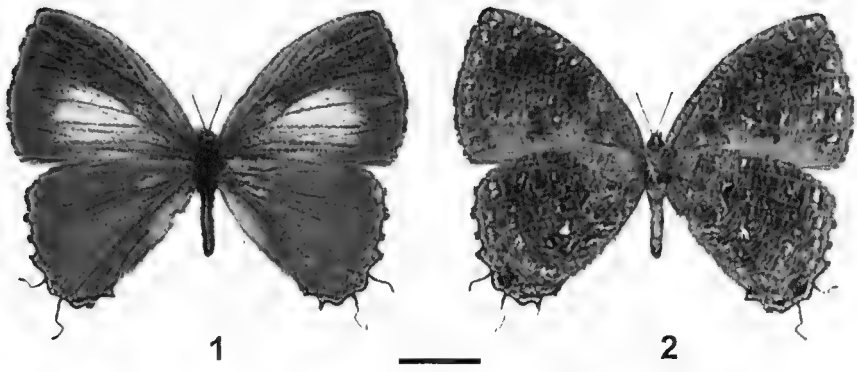
Male. Unknown.

Etymology. The new name honours the author's father, Jeffrey, who provided financial support for research in Indonesia prior to 1999.

Comments. *Acupicta jeffreyi* sp. n. is distinctive in having an underside pattern resembling that of *A. bubases* from Malaysia, but the black markings are very finely striated and the obscure bands in the subapical and inner margin areas of the forewing are straight, while in *A. bubases* these bands are offset toward the termen. The underside of *A. inopinatum* is less intricately marked than in *A. jeffreyi* and the arcuate black and metallic silver markings in the median area of the hindwing underside are almost touching, while in *A. jeffreyi* they are widely spaced. *A. inopinatum* bears a series of large brown subapical spots on the hindwing underside, which are absent in *A. jeffreyi*. Additionally, the hindwing upperside of *A. jeffreyi* does not bear a blue basal-median patch as in *A. inopinatum*.

No biological information appears to have been published for the genus *Acupicta*. The unique specimen of *A. jeffreyi* was notably inconspicuous as it fluttered several metres above the ground in very dense lower montane rainforest with little understory.

It is likely that known and undescribed *Acupicta* species will be discovered in the intervening region between Sulawesi and mainland New Guinea. A similar disjunctive distribution is known for the lycaenid genus *Artipe* Boisduval.



Figs 1-2. *Acupicta jeffreyi* sp. n., holotype female. (1) upperside; (2) underside. Scale bar = 5 mm.

Acknowledgements

The author wishes to thank John Tennent (London) for providing relevant literature and Vicki Savvas, who acted as research assistant while in Indonesia. Mr Yasuo Seki kindly provided distributional information on *Acupicta* in Borneo.

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A NOTE ON THE PUBLICATION DATE OF 'THE BUTTERFLIES OF PAPUA NEW GUINEA ...' BY M.J. PARSONS

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Abstract

The date of publication of M.J. Parsons' 'The butterflies of Papua New Guinea: their systematics and biology' is shown to be October 1998, not 1999 as indicated by the copyright citation in the book.

Discussion

Michael Parsons' recent book, *The butterflies of Papua New Guinea: their systematics and biology*, published by Academic Press in London is, and will surely remain, the standard work on Papua New Guinea butterflies for the foreseeable future. Since publication it has been cited in a number of entomological papers in the specialist press and it will not have escaped notice that the year of publication has been cited as both '1999' and '1998', in approximately equal measure.

The reason for this disparity is easily explained. On one hand, the Academic Press copyright date, incorporated in British Library and associated catalogue data, is 1999, and is given as such in the book. On the other hand, the volume was available for purchase by the public in 1998; for example, it was available in the bookshop of The Natural History Museum, London, in October 1998. Since there are no new taxa described in the book, a precise date of publication may be considered of little more than passing interest, but it does contain a number of 'taxonomic acts', including what amounts to revision of several butterfly groups. The actual date of publication is therefore potentially important. In view of the time that can be spent in researching the actual publication date of 'historic' scientific works, it is considered useful to resolve this issue now.

The commissioning editor for the volume was Andrew Richford, formerly of Academic Press and now of Elsevier, who has been most helpful in discussing publication of the book. He confirms that the actual release date was 15 October 1998 and this date may be used to establish taxonomic precedence. The copyright date of 1999 follows common commercial practice, whereby books published late in the year are copyrighted to the year following to ensure maximum promotional exposure and optimum listing by dealers as a 'new' publication. The copyright date is used in all formal bibliographical references and, in the opinion of Andrew Richford, is the correct citation of this publication.

There is some potential for confusion here and, since it is inescapable that the *actual* publication date of the book was October 1998, it is suggested that future citations for this volume should be either '1998' or '1999 (1998)'.

Reference

PARSONS, M.J. 1998. *The butterflies of Papua New Guinea: their systematics and biology*. Academic Press, London; xvi + 736 pp, xxvi + 136 pls.

A NEW SPECIES OF *ANTHERAEA* HÜBNER (LEPIDOPTERA: SATURNIIDAE) FROM EAST TIMOR

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Abstract

Antheraea lorosae sp. n. is described and figured from East Timor and compared with closely related species from the Sunda Shelf of Indonesia: *A. raffrayi* Bouvier from Bali and Java, *A. ranakaensis* Paukstadt *et al.* from Flores, *A. sumbawaensis* Brechlin from Sumbawa and a population of an (as yet) undescribed species from Alor. Male genitalia of these closely related species, all in the *frithi* subgroup of the *mylitta/frithi* group (a complex around *A. platessa* Rothschild), are figured for comparision.

Introduction

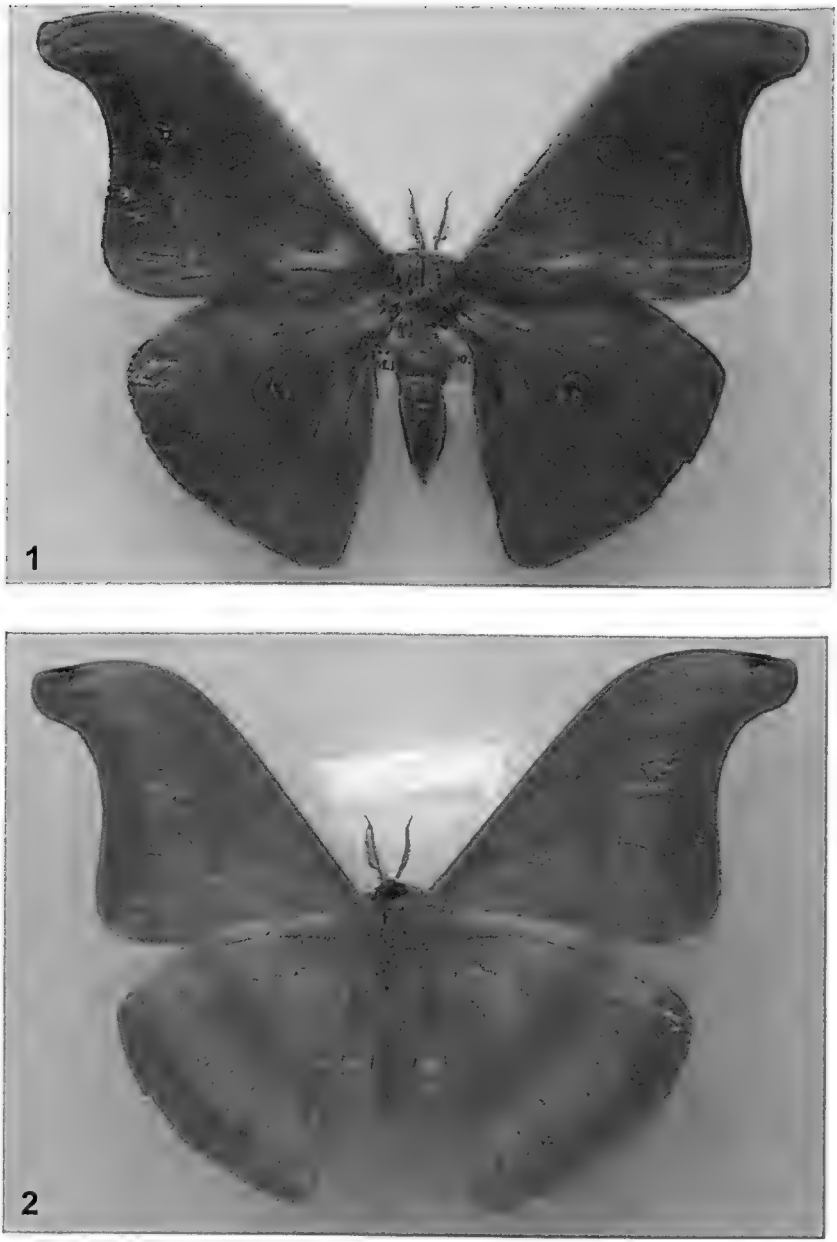
Very little is known about the Saturniidae of Timor. Rothschild (1895) first described *Attacus dohertyi* Rothschild from that island and a further 100 years elapsed before additional species were recorded. Late last century, representatives of the genera *Cricula* Walker, *Actias* Leach and *Samia* Hübner were recorded, although these new species were described from the nearby island of Flores. To date, no representatives of the genus *Antheraea* Hübner were known from Timor, until one of us (MDL) collected two male specimens in East Timor while engaged on a UN mission in 2002. A further eleven males and a single female were collected in January 2004, following a visit by two of us (DAL and MDL). After comparison with related species, noticeable pattern differences, coupled with its unique genitalic structures, led us to have no hesitation in describing this species as new.

Antheraea lorosae sp. n.

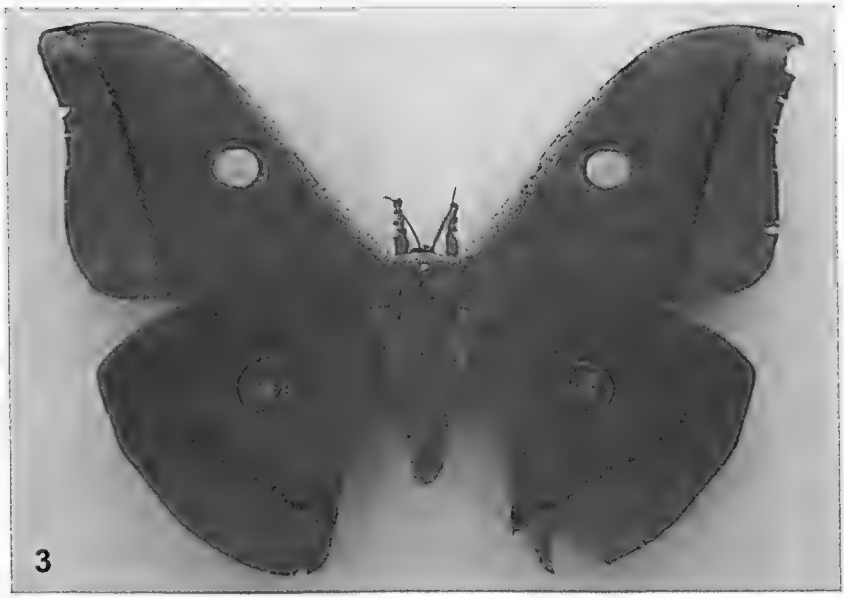
(Figs 1-5)

Types. Holotype ♂, EAST TIMOR: Bobanaro, 9°00'40"S, 125°21'49"E, 970 m, 24.x.2002, M.D. Lane, genitalia no. 913/03 Naumann, ex coll. D.A. Lane (in Australian National Insect Collection, Canberra). *Paratypes*: 1 ♀, 8 ♂♂, same data as holotype, but 16, 17, 18, 20.i.2004, D.A. & M.D. Lane (in coll. D.A. Lane, Atherton); 1 ♂, same data as holotype, but 26.x.2002, M.D. Lane, genitalia no. 867/03 Naumann, 3 ♂♂, same data as holotype, but 17, 21.i.2004, D.A. & M.D. Lane (in coll. Stefan Naumann, Berlin).

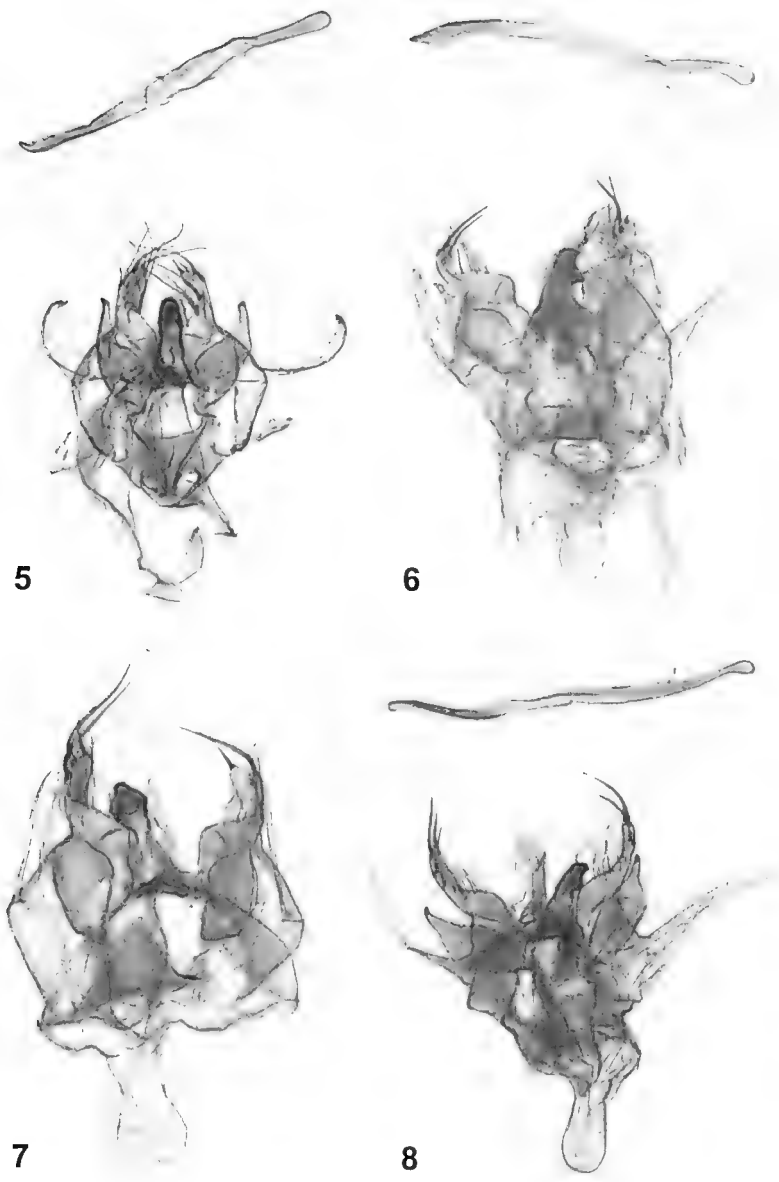
Description. Male (Figs 1-2). Forewing length (centre of thorax to apex) 69-75 mm. Antenna ochreous brown, 9.5 mm long; longest rami 2.7 mm, quadripectinate; apical 1.8 mm with very short rami, bipectinate. Head brown, collum greyish. Ground colour of wings, thorax and abdomen ochreous brown. Forewing with costa straight for basal three quarters, then sharply bowed to apex; apex quite sharply falcate; termen strongly convex below apex, nearly straight towards tornus; tornus rounded; dorsum straight. Dorsum and lower termen approximately square.



Figs 1-2. *Antheraea lorosae* sp. n., holotype male. (1) upperside; (2) underside.



Figs 3-4. *Antheraea lorosae* sp. n., paratype female. (3) upperside; (4) underside.



Figs 5-8. *Antheraea* species, male genitalia. (5) *A. lorosae* paratype, genitalia no. 867/03 Naumann; (6) *A. ranakaensis* paratype, genitalia no. 868/03 Naumann; (7) *Antheraea* sp. from Alor I., genitalia no. CBH-0364; (8) *A. schroederi* paratype, genitalia no. 870/03 Naumann.

Hindwing with termen rounded, tornus bowed, dorsum straight. Forewing with proximal two thirds of costa grey, apical part in ground colour. Antemedian and median areas of forewing in ground colour, an antemedian band barely visible, anterior to the eyespot slightly lighter. Forewing eyespot almost round, 4.5 mm in maximum diameter, very faint indication of hyaline centre, basally pink and white, posterior bordered dark grey, internal part in ground colour. Anterior to the postmedian line there is a greyish shadow of a zigzag line, strongly indented along veins, followed by a zone of approximately 3 mm width in ground colour. Postmedian band with upper half nearly straight, purplish grey, lower half indented along veins. Postmedian area slightly darker than ground colour, suffused with dark greyish scales, apical area light grey. Hindwing of same colour and pattern, eyespot almost round, 5.5 mm in maximum diameter, with a small hyaline centre of about 1 mm in size; wing pattern similar to forewing. Underside lighter ochreous ground colour, the forewing basally uniform to a more intensely coloured band through the eyespot which lacks the darker outer part of the upperside, followed by a greyish postmedian area and a dark ochreous marginal area. Apically on the costal margin there is a black patch. Hindwing underside with antemedian and postmedian area greyish; median band through eyespot ochreous, outer whitish and dark grey of the upper eyespot missing. Marginal area again darker ochreous, separated from the postmedian area by a row of additional dark violet brown marginal patches, one each between the veins.

Male genitalia (Fig. 5). As already mentioned in many descriptions of *Antheraea* species, the differences in male genitalia between different species within the so-called *mylitta/frithi* group are minor. Therefore, it was surprising to find one structure in the genitalia of *A. lorosae* which is unique for the whole genus and possibly is an indication of long isolation and/or very early separation of this species. In the ventral part of the valvae, emerging directly from the sacculus, is a small, third distinctive process of ear-like form, covered with small hairs. This ear-like process is unique in the genus *Antheraea*. The central process is similar to that in *A. ranakaensis* Paukstadt, Paukstadt & Suhardjono (Fig. 6), as well as in an undescribed species from Alor Island (Fig. 7). The dorsal process also is similar, but bears a different, mostly dorsal bristle. In *A. lorosae* the dorsal process is intermediate between the very short one of *A. ranakaensis* and the longer one in specimens from Alor. The labides, internal processes of the valvae, are longer and broader than the more slender ones of *A. ranakaensis* and of the Alor specimens. The uncus in all three populations is similar, while the juxta of *A. lorosae* is somewhat rounded but has lateral processes in both *A. ranakaensis* and the Alor population. The aedeagus in all three is of similar length but has a typical small hook at the distal end in *A. lorosae*.

Female (Figs 3-4). Forewing length 83 mm. Antenna light brown, 13 mm long, narrowly pectinate. Head light brown, collum light grey. Ground colour

of wings, thorax and abdomen light brown. Wing shape as in male, though wings much broader; forewing apex broad and not falcate; termen slightly concave; tornus and dorsum as in male. Hindwing as in male though more rounded. Forewing markings as in male but hyaline eyespot much larger, slightly elliptical (8 mm x 7 mm), concentrically ringed by a reddish brown band 2 mm wide, then edged basally by a thin pinkish line and circled by a narrow dark brown line (more prominent apically). Hindwing markings as in male; hyaline eyespot much larger, slightly elliptical, similar though slightly smaller to that of the forewing, inner concentric reddish brown band broader and more distinctly reddish basally. Underside eyespot concentric rings reduced in width, deeper reddish brown in colour.

Etymology. This new species is named after a proposal by its first collector, M.D. Lane: Lorosae = East. The local Tetun name for the people's homeland is Timor Lorosae, a name that dates back many centuries.

Distribution. To date, *A. lorosae* is known only from Bobanaro in East Timor. It is the most south-easterly known species in the genus *Antheraea*.

Comments. The *A. platessa* complex includes several interesting species which are superficially similar in appearance, but to varying degrees exhibit differing wing shapes and markings. When separating species in the *A. platessa* complex, key factors are genitalia differences, wing patterns and the form and pattern of fore and hindwing eyespots. *A. lorosae* has small eyespots with only a very faint indication of a hyaline centre in the forewing and small hyaline centre in the hindwing. *A. platessa* Rothschild has almost no hyaline centre on either wing, except for a few mainland specimens which show faint forewing hyaline centres, *A. raffrayi* Bouvier has no hyaline centres (c.f. Bouvier 1928), *A. sumbawaensis* Brechlin has small hyaline centres on both fore and hindwings, *A. ranakaensis* has larger hyaline parts also on both fore and hindwings, the specimens from Alor have nearly no hyaline parts, while *A. schroederi* Paukstadt, Brosch & Paukstadt always has large hyaline parts on both fore and hindwings.

Further stable differences between those species comprise the size of the fore and hindwing eyespots (quite small for *A. lorosae*, also for *A. platessa*, *A. raffrayi* and Alor specimens), the form of the forewing apex (slender in *A. lorosae*, as in *A. raffrayi* and Alor specimens) and the colour on average (lightest in *A. lorosae*, more olive in *A. ranakaensis* and Alor specimens, more chocolate in *A. raffrayi*, more colourful in *A. platessa* and *A. schroederi*).

Very few females of any of the closely related species are known. The single paratype female of *A. lorosae* differs from the female of *A. ranakaensis* in several noticeable features - the ground colour of *A. ranakaensis* is ochre; the forewing eyespot concentric rings on both upper and underside of *A. lorosae* are narrower than those of *A. ranakaensis*; the faint antemedian upperside

band of both fore and hindwing of *A. lorosae* is nearly tangential terminally to the eyespot, as opposed to nearly bisecting the eyespot in *A. ranakaensis*. Separation of the forewing postmedian line and eyespot is much greater in *A. lorosae* than in *A. ranakaensis*. On the underside the eyespots of *A. lorosae* are more nearly circular in shape; the antemedian band is more heavily marked and also more nearly tangential terminally to the eyespots. The forewing postmedian band in *A. lorosae* is absent on the underside and the hindwing postmedian band is present in the tornal area only. The female of *A. sumbawaensis* is presently unknown.

In wing shape, *A. lorosae* is closest to *A. ranakaensis*; however wing markings (upper and underside) are closest to *A. sumbawaensis*, placing *A. lorosae* intermediate between these species.

Nothing is known so far about the preimaginal instars of the East Timorese species.

Discussion

Much of the landscape of East Timor is heavily deforested, having been subjected to hundreds of years of clearing by its local inhabitants (c.f. Monk *et al.* 1997). With wood products being used in everyday living, coupled with agricultural practices, remnant patches of rainforest are mostly found on steep, largely inaccessible slopes of higher mountain ranges. Lower lying areas are subject to high temperatures and humidity for most of the year and remaining vegetation patterns in lower sections are mostly open scrubland with some eucalypt areas. Most of the rainforest areas occur above 700 metres elevation, often in fragmented patches along gullies and steep ridges. Large concentrations of fragmented rainforest are found within the districts of Balibo and Bobanaro. Several other species of Saturniidae were collected in both of these areas, including *Attacus dohertyi*, *Actias groenendaeli* Roepke, *Cricula hayatiae* Paukstadt & Suhurdjono and *Samia yayukae* Paukstadt, Peigler & Paukstadt (see also Peigler and Naumann 2003). The *A. lorosae* males mostly came to light after 10 pm (local time) on nights of heavy fog which followed storm rains. Further collecting efforts are expected to show that the species also occurs in West Timor, which is a part of Indonesia. Interestingly, known *Antheraea* specimens from Alor and Flores represent different species.

During the last 10 years a lot of knowledge about the insular species of *Antheraea* from the Indonesian and Philippine Archipelagos has accumulated. This has led to descriptions of several new species - *A. ranakaensis* from Flores, *A. sumbawaensis* from Sumbawa and *A. schroederi* from the Philippines. This recent knowledge about Indonesian populations has confirmed that different species occur on the different groups of the Larger and Lesser Sunda Islands and also the specific status of *A. raffrayi* on Java and Bali. For comparision with *A. lorosae* we mainly used material figured in

the original descriptions, as well as material from the collections of U. Brosch and S. Naumann, including genitalia preparations resulting from those specimens. Apart from mainland Asian specimens, the following were dissected:

A. sumbawaensis: genitalia no. 331/98 Naumann (figured in Brechlin 2000); no. 531/01 Naumann = CBH-0157.

A. ranakaensis: genitalia no. 868/03 Naumann (Fig. 6).

Antheraea sp. from Alor: genitalia no. 866/03 Naumann; no. CBH-0364 (Fig. 7).

A. platessa from Sabah, East Malaysia: genitalia no. 869/03 Naumann.

A. schroederi from Philippines, Negros I.: genitalia no. 870/03 Naumann (Fig. 8).

It will be interesting to search for further Saturniidae in East Timor. In parallel with Flores (c.f. Paukstadt *et al.* 1997), a second species of the genus *Antheraea* might also be expected in Timor, which would add additional knowledge about the origin and dispersal of this genus in the east.

Acknowledgement

We thank Ulrich Brosch (Hille, Germany), for support with technical assistance and comparisons with related taxa.

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NEW AND OVERLOOKED RECORDS OF BUTTERFLIES (LEPIDOPTERA) FROM ISLANDS OF THE GREAT BARRIER REEF, QUEENSLAND

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Abstract

Eleven species of butterflies are newly recorded from Dunk Island and four species are newly recorded from islands off Gladstone. Six previously overlooked species are also listed.

Introduction

Duckworth and McLean (1986) published lists of butterflies from many of the Great Barrier Reef island groups, from Stanley Island in the north (near Cape Melville) to Lady Musgrave Island in the south (east of Gladstone). They listed 11 species from Dunk Island (one of the Family Group, off Tully, northern Queensland), of which seven species were collected by McLean on 26 October 1982; this material is housed in the Australian Museum, Sydney. These species were *Cressida cressida cressida* (Fabricius), *Delias mysis mysis* (Fabricius), *Mycalesis terminus terminus* (Fabricius), *Cupha prosope prosope* (Fabricius), *Candalides erinus erinus* (Fabricius), *Nacaduba cyanea arinia* (Oberthür) and *Zizina labradus labradus* (Godart). The four previously recorded species were *Papilio ulysses joesa* Butler, *Ornithoptera priamus euphorion* (Gray), *Hypolimnas bolina nerina* (Fabricius) and *Cethosia cydippe chrysippe* (Fabricius) (Banfield 1908, 1911). One of these, *P. ulysses joesa*, was reported by Banfield (1908) as having been observed on Dunk I. on 26 May 1848 by John Macgillivray, naturalist on the expeditions of HMS Rattlesnake. It is also interesting to note that Banfield (1908) listed five species of butterflies. The fifth, perhaps a *Eurema* Hübner species, he described as 'the little yellow "wanderers" ever busy and active, came low over the water, weary with the long journey, and sometimes ready to rest - shifty flecks of gold on the white sail.'

New and overlooked records

Dunk Island

On 19 July 2003, I spent the day on Dunk Island and took the opportunity to collect or to make a note of the butterflies I saw there. The following 15 species were all observed or collected outside the National Park [new records are indicated by an asterisk]: *Catopsilia pomona* (Fabricius)*, *Melanitis leda bankia* (Fabricius)*, *Tirumala hamata hamata* (W. S. Macleay)*, *Euploea tulliolus tulliolus* (Fabricius)*, *Tellervo zoilus zoilus* (Fabricius)* and *Arhopala* Boisduval sp.* [*Arhopala micale amytis* (Hewitson) was common at Mission Beach on the mainland] were all observed, while *Ocybadistes ardea ardea* Bethune-Baker*, *Suniana sunias rectivitta* (Mabille)*, *Eurema hecabe hecabe* (Linnaeus)*, *Appias paulina ega* (Boisduval)*, *Mycalesis terminus terminus*, *Cupha prosope prosope*, *Hypolimnas bolina nerina*,

Nacaduba cyanea arinia and *Lampides boeticus* (Linnaeus)* were all collected. The 11 new records increase the number of species known from Dunk Island to 22.

Quoin Island

Duckworth and McLean (1986) listed 28 species from a group of islands off Gladstone, central Queensland, viz: Curtis, Garden, Compigne, Wiggins and Facing Islands. On 3 September 1961, I collected on Quoin Island, located south of Curtis I. and between Garden and Facing Is. Quoin I. is described in a tourist resort brochure as 'with an area of 87 acres and a shoreline of three miles [it] is one of the numerous islands surrounding Gladstone and is unique because of its unusual and rugged contours.' Twelve species of butterflies were collected on Quoin I., of which five are additional to Duckworth and McLean's (1986) listing for the island group. These are *Eurema brigitta australis* (Wallace), *Eurema herla* (W. S. Macleay), *Elodina parthia* (Hewitson), *Elodina queenslandica* De Baar & Hancock and *Zizeeria karsandra* (Moore), the latter previously recorded by Peters (1963). This brings the total number of species known from the group to 33.

Overlooked records

Duckworth and McLean (1986) also inadvertently omitted *Allora doleschallii doleschallii* (C. Felder) from Magnetic Island (near Townsville), *Euploea alcathoe eichhorni* Staudinger from Lindeman Island (east of Proserpine) and *Belenois java peristhene* (Boisduval) from the Percy Isles (east of Sarina), all recorded by Common and Waterhouse (1981), and the earlier records of *Hypochrysops apelles apelles* (Fabricius) from Magnetic Island and *Ogyris zosine zosine* (Hewitson) from the Whitsunday Islands (Wyatt 1955).

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A REVIEW OF THE FRUIT FLY TRIBE PLIOMELAENINI (DIPTERA: TEPHRITIDAE: TEPHRITINAE) IN THE INDO-AUSTRALIAN REGION

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Abstract

Five genera and 17 species of Indo-Australian Tephritinae are placed in the tribe Pliomelaenini. *Quadrimelaena* gen. n. is described to include *Q. quadrimaculata* (Agarwal & Kapoor), comb. n. from India, *Q. sonani* (Shiraki), comb. n. from Taiwan [type species] and *Q. translucida* (Hering), comb. n. from Sri Lanka [all transferred from *Pliomelaena* Bezzi].

Introduction

The tribe Pliomelaenini is an Afrotropical and Indo-Australian group of Tephritinae that breeds in the flowerheads of Acanthaceae such as *Asystasia, Dicliptera, Hypoestes, Justicia* and *Lepidagathis* (Hancock *et al.* 2003). Previously known as tribe Platensinini, that name was transferred to the Dithrycini as a subtribe and redefined by Hancock (2001). All species have 3 pairs of frontal, 2 pairs of orbital and 4 scutellar setae, mostly of uniform coloration although the upper pair of orbitals are sometimes paler.

Five genera occur in the Indo-Australian region: *Elaphromyia* Bigot, *Pliomelaena* Bezzi, *Pseudafreutreta* Hering, *Quadrimelaena* gen. n. and *Sundaresta* Hering. The first three also occur in Africa. The 17 Indo-Australian species are poorly understood, with most known from very few specimens. Three species occur in Indonesia and two in Papua New Guinea but the tribe has not yet been recorded from Australia.

One currently included species is excluded from the tribe; others were noted by Hancock (2001). '*Elaphromyia*' *magna* Hardy, from Java (Hardy 1988), has a relatively short wing, bare arista, subshining black spot between eye and antennal base, dense scale-like setae on the scutum and a densely tomentose abdomen and does not belong in *Elaphromyia*. Its taxonomic position is uncertain but it appears to belong near *Afreutreta* Bezzi in tribe Eutretini.

Elaphromyia Bigot

This genus is characterised by the elongate, almost parallel-sided wings with numerous subhyaline or diffusely yellow spots on a brown pattern. Vein R_1 lacks a bare, non-setose dorsal area below the end of vein Sc. Six Indo-Australian species are known.

Elaphromyia hardyi Wang, from southwestern China (Sichuan), differs from all other species in having a basomedial longitudinal hyaline band on the wing. It was illustrated by Wang (1998).

Elaphromyia multisetosa Shiraki, from Taiwan, is distinguished from *E. pterocallaeformis* by the palpi, which have numerous stout, black setae on their ventral margins. It was illustrated by Shiraki (1933).

Elaphromyia pterocallaeformis (Bezzi) is widespread in south and southeast Asia, including Indonesia (Hering 1941). It lacks a medial longitudinal hyaline band and the palpi have only a few yellowish setae on their ventral margins. It was illustrated by Hardy (1974) and Wang (1998). *E. incompleta* Shiraki and *E. i. punctata* Shiraki were placed as synonyms by Wang (1998).

Elaphromyia siva Frey is a small species known only from Sri Lanka.

Elaphromyia transversa Hardy occurs in Papua New Guinea. It resembles *E. pterocallaeformis* but the subhyaline spots on the wing are arranged in transverse rather than longitudinal rows. It was illustrated by Hardy (1988).

Elaphromyia yunnanensis Wang is known from southwestern China (Sichuan, Yunnan). It differs from *E. pterocallaeformis* in the larger and more extensive hyaline wing spots along the anterior and posterior margins and the shorter oviscape. It was illustrated by Wang (1998).

Pliomelaena Bezzi

Indo-Australian species generally have the head and thoracic setae yellow with a brownish tint, except for the postvertical, lateral vertical and postocular setae, which are whitish. The wing has three hyaline spots in cells r_1 and r_{2+3} forming a more or less distinct 'V' (as in all Afrotropical species) and three hyaline indentations in cell m. *Protephritis* Shiraki and *Indaresta* Hering are synonyms (Hardy 1988). Five species are included.

Pliomelaena callista (Hering) is known from Indonesia and Papua New Guinea. The wing pattern is a little variable but it has three hyaline indentations in cell r_1 and no hyaline spot in cell br before R-M crossvein. It was illustrated by Hering (1941) and Hardy (1988).

Pliomelaena luzonica Hardy is known only from Luzon in the Philippines. It is similar to *P. callista* but has only two hyaline indentations in cell r_1. It was illustrated by Hardy (1974).

Pliomelaena sauteri (Enderlein) is known from Taiwan and southeast China (Hainan). It is very similar to *P. callista* but has the hyaline spot at the base of the pterostigma well developed, rather than vestigial or absent. It was illustrated by Enderlein (1911) and Wang (1998).

Pliomelaena udhampurensis Agarwal & Kapoor is known only from northwestern India (Jammu and Kashmir). It is similar to *P. luzonica* but has a hyaline spot in cell br before R-M crossvein and the abdomen is almost entirely brown to black. The yellowish head and thoracic setae are a darker brown than in other species. It was illustrated by Agarwal and Kapoor (1988).

Pliomelaena zonogastra (Bezzi) is known from India (including Nicobar Islands) and southwestern China (Yunnan). It is similar to *P. udhampurensis* but the abdomen is largely reddish-yellow, rather than brown to black. It was illustrated by Wang (1998).

Pseudafreutreta Hering

This largely Afrotropical genus differs from *Pliomelaena* in the absence of a row of setae along the sides of the epistome and the darker wings, the hyaline spots and indentations being small or largely absent. Vein R_1 lacks a bare, non-setose dorsal area below the end of vein Sc (present in *Pliomelaena*).

Pseudafreutreta nigrifacies (Wang) occurs in southwestern China (Yunnan) and northern Thailand. It was transferred from *Platensina* Enderlein by Hancock (2001) and illustrated by Hancock and McGuire (2002). A male has been collected on *Strobilanthes imbricatus* (Acanthaceae) in Thailand (Hancock and McGuire 2002).

Quadrimelaena gen. n.

Type species *Protephritis sonani* Shiraki, 1933, by present designation.

Quadrimelaena closely resembles *Pliomelaena* in most characters, including the presence of a row of setae along the sides of the epistome, but these setae are weaker, the wings are narrower and more elongate, there are two hyaline spots (one anterior and one posterior, rather than one medial) in the outer half of cell dm beyond the level of the R-M crossvein and four (rather than three) marginal/submarginal spots or indentations in cell m, the inner, extra indentation above the apex of vein Cu_1. The hyaline spots in cells r_1 and r_{2+3} do not form a 'V' and several small posterior spots (absent in *Pliomelaena*) are present in cell r_1 along vein R_{2+3}. It further differs from Asian *Pliomelaena* species in the more rounded third antennal segment (rather than slightly concave dorsally), longer and almost parallel ocellar setae and the brown rather than yellowish head and thoracic setae, except for the whitish postvertical, lateral vertical and postocular setae. For a more detailed description see that of the type species (Shiraki 1933).

Three species are included, all transferred from *Pliomelaena*. Korneyev (1999) suggested that *Ictericodes cashmerensis* (Hendel) might also belong here but its head and thoracic setae are mostly yellow-brown with the upper orbitals paler, there is a brown spot between the eye and antennal base, vein R_{4+5} is extensively setose above and below and cell bcu has a longer apical extension.

Quadrimelaena quadrimaculata (Agarwal & Kapoor), comb. n. is known only from northwestern India (Himachal Pradesh). It differs from *Q. sonani* in the fewer small hyaline discal spots and was illustrated by Agarwal and Kapoor (1989).

Quadrimelaena sonani (Shiraki), comb. n. occurs in Taiwan. It was originally placed in *Protephritis* and illustrated by Shiraki (1933).

Quadrimelaena translucida (Hering), comb. n. occurs in Sri Lanka. It differs from the other species in the more extensive hyaline discal areas and lack of a hyaline apical spot on the wing. It was illustrated by Hering (1942).

Sundaresta Hering

This genus differs from *Pliomelaena* primarily in the presence of two (rather than one) distinct marginal hyaline indentations in cell r_{2+3}. The oviscape is elongate, as long as or longer than the abdomen.

Sundaresta hilaris Hering is known only from Java and Sumba in Indonesia. It was illustrated by Hardy (1988).

Sundaresta malaisei (Hering) is widespread in India, Burma, southwestern China (Yunnan), Thailand and Laos. It differs from *S. hilaris* in the more numerous small hyaline spots on the wing. It was transferred from *Xyphosia* Robineau-Desvoidy and illustrated by Hancock and McGuire (2002). Both sexes have been collected on *Strobilanthes imbricatus* (Acanthaceae) in Thailand (Hancock and McGuire 2002).

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WANTED. Specific butterfly collection data for inclusion in a planned systematic list of the butterflies of Micronesia, Melanesia and Polynesia plus the Bismarck Archipelago. Even common butterflies with reliable island data are valuable. John Tennent, 38 Colin McLean Road, Dereham, Norfolk NR19 2RY, England (e-mail jt@ storment.freeserve.co.uk).

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